

Visual Rehabilitation and Tolerability Using Hybrid Contact Lenses of Patients with Moderate to Severe Keratoconus



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Abstract

Purpose: Aim of this study is to show efficiency of hybrid contact lenses for keratoconus

Method: 19 eyes of 11 patients who had been recommended surgery with moderate to severe keratoconus was taken to study and hybrid contact lens was fitted.

Results: Before using contact lens, uncorrected and best corrected visual acuity with glasses were 0,74±0,3 Log MAR and 0,58±0,22 Log MAR respectively. Visual acuity with hybrid contact lenses was 0,09±0,05 Log MAR.

Conclusion: Hybrid lens like Clear Cone is the good option for keratokonus patients for intended vision and comfort.

Introduction

Keratoconus is non inflammatory and progressive disease of the younger age group in which corneal thinning occurs and cornea assumes a conical shape associated with abnormal curvature. This changes often results in irregular astigmatism and myopia and leads to mild to marked visual impairment [1]. Corneal topography is a non-invasive technique to detect and monitor the progression of keratoconus. Contact lenses were used to improve visual conditions in keratoconus. Rigid gas permeable (RGP) lenses are most used type of contact lenses but in patient with severe disease RGP lens is insufficient for visual impairment and comfort [2]. Irregular astigmatism which developed after ectasia is not corrected with glasses and soft contact lenses. Mini-scleral, semi-scleral and scleral contact lenses are safe options in the management of irregular corneas. Because of heavy costs of scleral lenses, hybrid lenses with the comfort of the soft lenses and the optical quality of the hard lenses are developed [2]. This article reports the efficiency and accuracy of hybrid contact lens known as Clear Kone (Synerg Eyes Inc., Carlsbad, CA) in patients with moderate to severe keratoconus.

Methods

This study was performed in Medical Park Hospital, Antalya, Turkey. The patients were requested to sign informed consent forms. Patients had been previously diagnosed with keratoconus by corneal topography (Pentacam HR, Oculus, Wetzlar, Germany) and bio microscopic findings of Fleisher ring and Vogt lines. Inclusion criteria were keratoconus patients with severe visual problems and indication of intra corneal ring or transplantation surgery by another eye center. Cross linking was performed for all patients before the study. All patients were not appropriate for rigid gas permeable (RGP) lenses. All eyes were fitted with Clear Kone hybrid keratoconus lenses. The fitting is based on the concept of sagittal depth called as vault in relation to the cornea. Skirt curvature was determined as steep, median or flat according to limbus. Proper fitting was observed with using sodium fluorescein. After fitting, control of lens movement, vision and corneal epithelium were performed, 3 hours later. Corneal topography findings, pachymetry and refraction and vision were determined every 6 months.

Results

In this study, 19 eyes of 11 patients (6 men and 5 women) with a mean age of 26, 4 (16-43) were evaluated. Keratometry findings are between 55-75 (Kmax). Before using contact lens, uncorrected and best corrected visual acuity with glasses were 0, 74±0, 3 LogMAR and 0, 58±0, 22 Log MAR respectively. Visual acuity with hybrid contact lenses was 0, 09±0, 05 LogMAR (Table 1). Mean follow-up was 7, 2 months (4-12 months). One patient didn't tolerate because of corneal edema.

Table 1: Best corrected visual acuity (BCVA), K and pakimetric values and contact lens corrected visual acuity (CLCVA) findings for all patients.

	BCVA Logmar	Simk 1	Simk 2	Steepest K	PAK	CLCVA Logmar
1	0,398	49,63	44,35	51,08	480	0,000
2	1,000	60,16	51,53	60,79	445	0,046
3	0,699	52,96	48,56	54,72	478	0,155
4	1,000	55,33	48,84	56,62	455	0,155
5	0,699	48,82	44,88	50,69	502	0,097
6	0,699	51,06	47,27	52,91	495	0,301
7	0,699	48,01	42,45	54,27	490	0,222
8	0,398	46,73	42,22	47,61	490	0,000
9	0,523	56,25	49,06	59,26	465	0,046
10	0,301	50,91	45,36	56,67	480	0,000
11	0,523	49,85	46,49	51,42	495	0,000
12	0,523	56,53	48,98	57,11	440	0,222
13	0,155	54,88	49,20	57,11	460	0,046
14	1,000	53,76	44,34	55,76	455	0,301
15	0,301	52,82	49,27	58,76	460	0,097
16	0,301	49,93	45,01	55,76	462	0,000
17	1,000	64,78	57,30	68,39	421	0,046
18	0,699	60,05	48,08	61,69	477	0,046
19	0,222	50,52	44,70	55,71	505	0,000

Discussion

The first treatment choice for a patient with keratoconus is using a RGP lens [3]. Therefore, most of these patients, visions not corrected by glasses or soft contact lenses, have already tried the RGP lenses. The potential challenges associated with fitting rigid lenses are suboptimal initial comfort on non adapted eyes, the potential for lens decentration and the risk of lens ejection. Soft contact lenses have more comfort but less visual correction especially in advanced disease. Aim of hybrid lens is to combine the preferred properties of rigid and soft contact lenses [4]. Hybrid lenses are combines of a center-zone rigid lens and a peripheral zone soft skirt. Clear Kone lens which is used this study requires the determination of two fitting parameters, vault for rigid component and skirt curvature for soft component [5]. Due to design of the hybrid lens, most of the refraction power is provided by the tear layer, which increases the optical quality and oxygen supply of the cornea. Additionally, a little space

between cornea and hard part of the lens prevents mechanical abrasion of the cornea [4] (Figure 1).

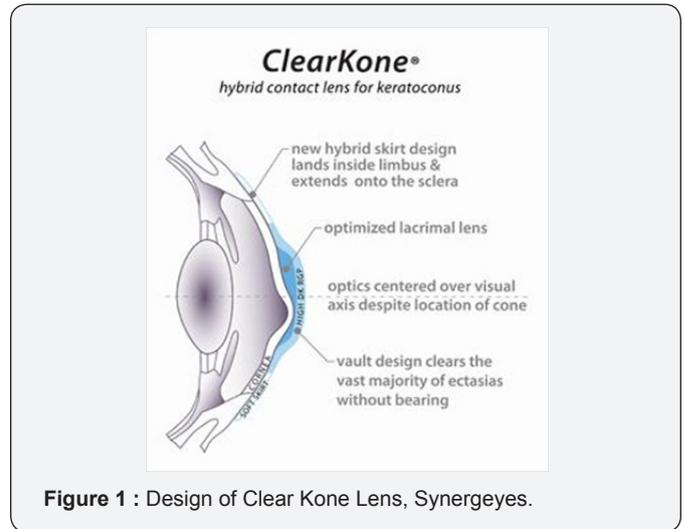


Figure 1 : Design of Clear Kone Lens, Synergeyes.

In our study, all patients have moderate to severe keratoconus and discomfort while using RGP lenses. Because of this condition, by other eye centers, corneal ring or keratoplasty were advised. Before the surgical treatment, we wanted to try another non-invasive management, hybrid lens fitting. Disadvantage of using hybrid lens, Clear Kone Synerg Eyes, is that this process is time consuming and requires more patience. Because of this, for appropriate final lens and shortening of process, we used the parameters of RGP lenses. This approach improved patients' compliances. Clear Kone lenses with hard central part and tears between lens and cornea improve vision. In our study, all patients had a good visual outcome. Soft peripheral part provides stability and comfort. Except one patient, 10 of 11 patients had a good comfort.

According to findings of this study, using hybrid lens on the keratoconus patients can be good choice for the patients with moderate to severe disease with discomfort of soft or hard lenses before thinking surgical management.

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